

1. 2019年9月開始的澳洲森林大火(Australia bushfires)延燒範圍前所未見，造成之生態影響難以評估。試說明氣候變遷(climate change)在此事件中的角色，並以污染物在環境中傳輸及轉化的角度，說明此大火對當地及鄰近地區空氣、水及土壤品質的影響。(15 points)
2. 何謂「食物、能源與水的鏈結」(Food-Energy-Water nexus)? 請舉例說明。(15 points)
3. 何謂「線性經濟」(linear economy)和「循環經濟」(circular economy)? 請舉例說明循環經濟的運作模式及可能遭遇的挑戰。(20 points)
4. 近年政府機關辦理土壤與地下水污染廠址風險評估，特別注重於風險溝通，請敘述何謂風險評估、風險溝通，以及其相關執行內容與步驟。(15 points)
5. 近年全球電動車市場蓬勃發展，國內對於推動電動車(含私人運輸工具與大眾運具)亦不遺餘力，請評估推動電動車對環境的正負面影響。(15 points)
6. 請詳讀以下文章，並根據文意，評論土地、環境資源、能源、企業社會責任的相互關係與取得平衡的重要性，並評論在土地與自然資源濫用下所可能造成的環境衝擊。(20 points)

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### Big brands sourcing illegal palm oil from habitat of orangutans, rhinos, elephants and tigers: study

(資料來源: <https://www.eco-business.com/>; 2019.10.01 刊登)

Some of the world's biggest consumer goods firms have been sourcing palm oil from plantations illegally developed in Indonesia's Leuser Ecosystem, one of Southeast Asia's most important remaining rainforests that is home to critically endangered elephants, rhinos, orangutans, and tigers.

An undercover field investigation by environmental group Rainforest Action Network found that two palm oil traders that supply the firms—Singapore-headquartered Musim Mas and Golden Agri-Resources (GAR)—have been sourcing from plantations that have been deforesting the nationally protected Rawa Singkil Wildlife Reserve in Sumatra's Singkil-Bengkung region. The findings undermine long-standing commitments made by the likes of Mars to distance themselves from suppliers that fell rainforests to produce palm oil, an ingredient found in about half of all supermarket products. The report, which is part of the website Leuser Watch, also points to the banks that are financing the palm oil traders. They include Singapore's OCBC Bank, Japan's Mitsubishi UFJ Financial Group, and Dutch bank ABN Amro.

Singkil-Bengkung is not only a wildlife hotspot. Its peatlands are the largest and deepest in Aceh, and the drainage of the carbon-rich land has left the area vulnerable to haze-causing fires that bedevil Indonesia almost every dry season. Over the past decade, 18,000 hectares of forests within Singkil-Bengkung have been cleared for plantations.

In one of two investigations conducted in early 2019, RAN followed freshly harvested oil palm fruit grown on peatlands inside the protected reserve to a mill believed to supply Musim Mas and GAR, two of the world's largest palm oil firms. RAN said in the report that a lack of investment in traceability and compliance systems by big palm oil companies, combined with low palm oil prices and competition for higher-quality oil palm fruit among underperforming mills had meant that consumer goods brands continued to buy conflict palm oil.

—Both Musim Mas and GAR are members of the Roundtable on Sustainable Palm Oil (RSPO), the industry certifier for palm oil grown in areas free from deforestation. An RSPO spokesperson said that the plantation companies in RAN's report are not RSPO members, and they have not received any complaints about the two mills in the study.

見背面

Unilever, a member of the Consumer Goods Forum which pledged to be deforestation-free by 2020, said that the company “has started its grievance process so any appropriate action can be taken”. It is in contact with both Musim Mas and GAR over the issue. Nestlé, another multinational firm told Eco-Business that GAR was investigating the matter, and had confirmed that the two mills in question “do not source palm oil from plantations engaged in deforestation activities in the Rawa Singkil Wildlife Reserve.” The company added that all of its supply chain is now monitored by satellite technology, a move that the company announced a year ago. Mondelez International, also a multinational firm said the company has required all of its palm oil suppliers to use sustainable practices since 2014, and while it has made progress to incentivise plantation companies still deforesting to “stop, or be excluded,” the consumer goods industry “cannot win the fight against deforestation alone.” Partnership with governments, suppliers, and farmers is critical, he said.

Eco-Business has approached the other companies mentioned in the report for comment.

RAN commented: “The Singkil-Bengkung region of the Leuser Ecosystem presents a rare opportunity to still get it [conservation] right. This area still has vast, intact habitat for elephants, rhinos, orangutans, tigers and countless other species, but without real action by snack food companies and major banks, this treasure and globally important, natural carbon sink will be lost to a death by a thousand cuts.”

(補註：勒瑟生態系統(Leuser Ecosystem)是位於印尼蘇門答臘島上的亞齊省和北蘇門答臘省的一片森林。它佔地260萬多公頃，是東南亞最豐富的熱帶雨林之一，也是地球上在一個區域內發現蘇門答臘象，犀牛，老虎和猩猩的最後一個地方。它擁有世界上最豐富但鮮為人知的森林系統之一，其植被是地球氧氣的重要來源。)

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